



**HYDRO**

[www.elleditech.com](http://www.elleditech.com)

*Elledi*

YOUR TECHNOLOGY PARTNER



# ACCURACY AND PRECISION

THE MILESTONES OF ELLEDI SNC

SECTORS ▶

HYDRO

AUTOMOTIVE

RAILWAY

▶ HOW WE ARE

We are Elledi, since 1992 we have been working and learning together with some of the most influential companies involved in the hydroelectric power generation business for the past 30 years.

We strive to introduce innovative solutions that help businesses increase their effectiveness, thanks to our almost 3 decade-long experience we are able to provide high-efficiency and continuous improvement to every sector in which we are

involved, as well as our range of products and services, working together with customers through the entire production process to create custom solutions that fit perfectly. We manufacture high-quality, custom-sized Pelton, Francis and Kaplan hydroelectric turbines from single metal blocks.

Whether you are looking for a reliable business partner in either the hydroelectric or automotive molding field, Elledi is the right choice for your business.

▶ MISSION

Since the beginning our main focus has always been to supply products and services capable of fulfilling the expectations of our customers in terms of quality and efficiency, in addition to keeping an eye out for safety and environmental sustainability.

▶ OUR TEAM



State of the art  
for milling components





# FROM STEEL TO WATER



RAW MATERIAL

Working with several European forges, Elledi buys raw material from its long-time trusted partners, assuring first-rate quality and timely dispatch.

All forged-shaped discs are delivered with certificates, according to requested standards.

We mainly work with  
**STAINLESS STEEL** 1.4313  
1.4417



CAD+CAM

Cam focuses on turning toolpaths into a language milling machines can process.

Based on the project's requirements, our skilled technicians go through a series of optimization steps like shape/geometry analysis, collision check and scrap analysis to make sure the production process is as efficient as possible.



3D ADVANCED MODELING

3D modeling programs are used to work on scans, which at first look like a set of points in a three-dimensional simulated space. A 3D designer can take that collection of points to manipulate and define edges, polygons and surfaces.

This process is done hand in hand with the customer, to make sure there is no misunderstanding about the project's requirements, and is essential to understanding the feasibility of a project, and proposing modifications to upgrade design quality.

We are experienced in designing A-class surface 3D models.

STEEL TO WATER





# 3D - ENGINEERING



3D SCANNING

3D scanning leverages optical technologies to capture the shape and silhouette of a physical object to then recreate it in a digital environment without need of physical contact. Compared to traditional methods, 3D scanning is much quicker and offers a higher level of precision.

When the scanning process is done, the program generates a "cloud of points", a rough outline of the object, which is then translated to STL, a file format that CAD designers can work on to refine it. Furthermore, scans can be carried out at the customer's production plant.

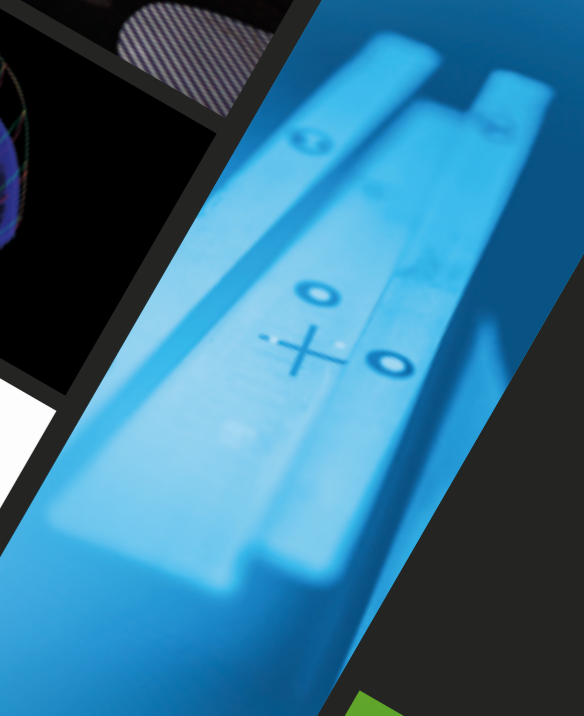
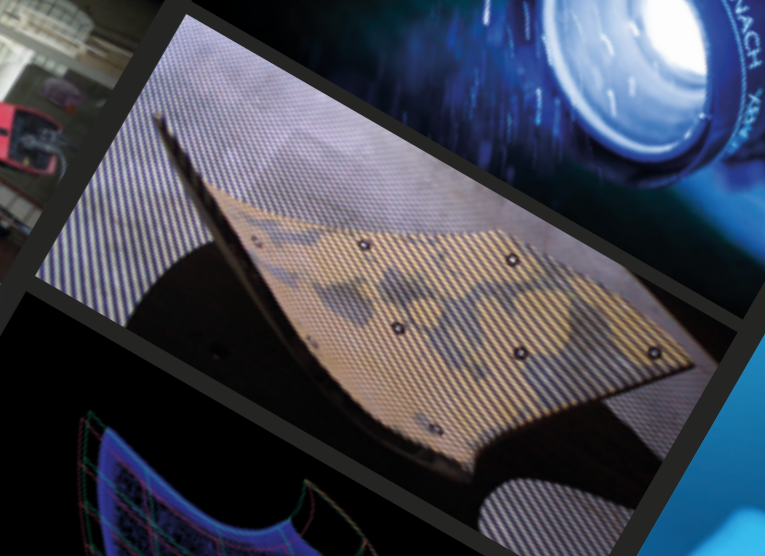
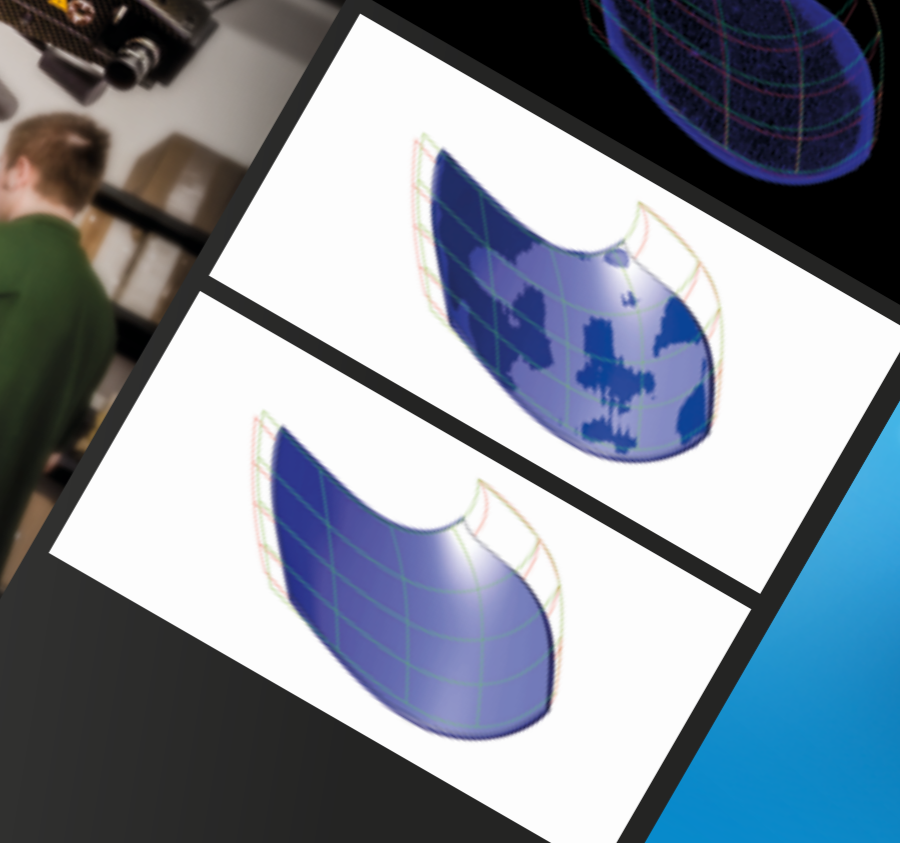


REVERSE ENGINEERING

The reverse engineering process, which uses 3D scanning technologies, grants us the ability to deduce how a physical product was made, to then digitally transfer its shape and rebuild it thanks to 3D mechanical drawing software.

Through the usage of surface modeling technologies, the mesh is used to produce a mathematical model according to the detected surfaces. The said object is reproduced in a CAD 3D format, which can then be worked on and modified locally in a timely and precise manner.

3D ENGINEERING





# MANUFACTURING PROCESS



MANUFACTURING

There is always room for improvement when it comes to industrial products, where designs can be enhanced steadily and new technologies pop up rapidly.

We have always viewed problems from a different angle, coming up with new solutions and identifying the market's needs in advance. Keeping up with the latest tech trends, we get inspiration and combine it with our experience to constantly

innovate and expand the market we are working with, using lean production methods to track our improvements.

Our extensive experience adds value to the product; we always look forward to coming up with new ways of upgrading our processes and reducing lead time.

# FINISHES

POLISHING AND WELDING

Surfaces are flattened and refined through manual polishing, and welding is performed by our operators, or by our external certified partners in case welding operations or thermal treatment are needed.

The CNC-worked surfaces are polished, thus guaranteeing maximum quality level.



## WELDING

High quality welding is performed by our skilled and experienced operators.



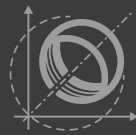
## POLISHING

The CNC-worked surfaces are flattened and refined through manual polishing.

MANUFACTURING PROCESS



# QUALITY



DIMENSIONAL REPORT

Using the optical scanner ATOS Core we can inspect any physical object by defining its shape without any kind of contact, in addition to not being restricted by weight or size limits.

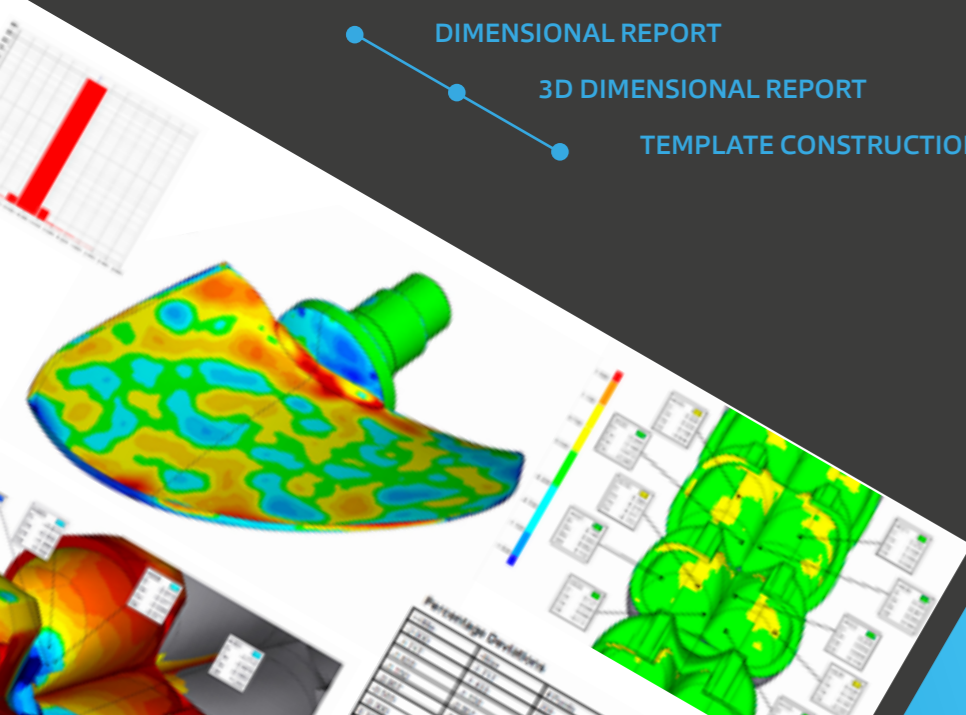
Scanning at the customer's premises is a possibility, thanks to Atos' Core ease of transportation/mobility

## THE INSTRUMENT OUTPUTS THE FOLLOWING MATERIAL

DIMENSIONAL REPORT

3D DIMENSIONAL REPORT

TEMPLATE CONSTRUCTION



NDT - NON DESTRUCTIVE TESTS

NDT is a testing and analysis procedure that allows for a cost-effective way of checking a product's internal structure, integrity, welding defects, surface cracks etc.

Many imperfections cannot be seen by the human eye, that is why a selection of machines are needed to run those tests.

The main advantage of NDT comes from the fact that it does not permanently alter the article that's undergoing inspection, in addition to not damaging it.



BALANCING

Turbine's balance is essential, and it must be tested still and in motion to point out asymmetries and undistributed weight that might stress the bearing, thus increasing the wheel's expected lifespan. When balancing a rotating body, vibration is to be avoided since it undermines the efficiency of hydro wheels and can sometimes lead to machine failure.

In case an anomaly is found, it is solved by adding or subtracting a counterbalancing weight.

MT Magnetic Test

a method used to detect surface and slightly subsurface flaws in ferromagnetic materials.

PT Liquid Penetrant Test

a liquid dye is applied to a metal surface, revealing cracks and surface imperfections.

UT Ultrasonic Test

QUALITY CHECKS





## PRODUCT SHOWCASE

Accuracy is our main focus, since it's the most relevant factor that influences a wheel's final efficiency and level of productivity.

Thanks to our experience and lean model of production we have reached excellent levels of precision: the great majority of wheels we balance do not require any additional material removal, thus saving precious lead time and guaranteeing top-tier wheel quality, as well as a longer expected lifetime.

We manufacture high-quality, custom-sized Pelton, Francis and Kaplan hydroelectric turbines from single metal blocks.

PACKAGING AND PRODUCTION

## LOGISTICS

### EFFICIENT FORWARDING

PACKAGING

Elledi provides the right kind of packaging on request, for sea and air transport in order to avoid Turbine rusting and oxidation.





PRODUCT SHOWCASE

# FRANCIS

## Clockwork spinning precision

📏 **MAX SIZE :** Ø 1900 mm

📊 **MAX WEIGHT :** 10 ton

📦 **MATERIALS :** 1.4313 – 1.4417

🏭 **PRODUCED :** >500

The Francis turbine is the most popular and widespread water runner in the world, in addition to being one of the first hydroelectric turbine designs to be ever created.

When it comes to production, the Francis Wheel takes the longest to manufacture therefore, using our experience and cutting-edge technologies, we have developed a range of technical solutions that simplifies their manufacturing process resulting in lower lead time, even with complex geometry pieces.

Throughout all steps of production, from raw material to finished product, our quality standard ensures that all technical requirements are met

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HYDROELECTRIC TURBINE MANUFACTURING

FRANCIS

FRANCIS



# PELTON

Meticulously-designed buckets for top-tier energy production

📏 **MAX SIZE:** Ø 2700 mm

🏗️ **MAX WEIGHT:** 10 ton

📄 **MATERIALS:** 1.4313 – 1.4417

🏭 **PRODUCED:** >500

Our most requested wheel, the Pelton, is carefully milled bucket by bucket to make the most out of every single water jet, while distributing pressure uniformly on the whole surface to reach a total estimated efficiency of up to 95%.

Every Pelton wheel that comes out of our factory is of the highest quality grade and comes with a 3D dimensional report certificate, along with a standard dimensional report and an NDT certificate.

Carefully manufactured for top-tier efficiency, our Peltons are all made from a single steel block.

PELTON



# KAPLAN

Precise rotating blades for maximum adaptability and toughness

📏 **MAX SIZE :** Ø 1800mm (per blade)

🏗️ **MAX WEIGHT :** 10 ton (per blade)

📦 **MATERIALS :** 1.4313 – 1.4417

🏭 **PRODUCED :** >300

Kaplan Turbines can operate in horizontal and vertical position depending on the situation. They're considered axial flow wheels, since water flows through them axially from the wheel's rotational axis. The mechanism is quite simple: water enters the turbine from its sides through guiding vanes, which then directs the fluid according to the angle that gives the highest power production efficiency.

Our Turbines are closely examined and double-checked during every single step of production, from raw material to finished product; their quality is backed by our 3D dimensional control procedures.

Elledi produces Kaplan blades designed for maximum power output, which can then be attached to an existing hub.

KAPLAN





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